Boundary value problems associated with singular strongly nonlinear equations with functional terms

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The talk concerns boundary value problems associated with singular, strongly nonlinear differential equations with functional terms of the type

$$\begin{cases} (\Phi(k(t)x'(t)))' + f(t, G_x(t))h(t, x'(t)) = 0 \ , \ t \in [a, b] \\ x(a) = H_a[x], \ x(b) = H_b[x]. \end{cases}$$

The nonlinear differential operator Φ is a general strictly increasing homeomorphism; the coefficient k is non-negative and it may vanish on a set of null measure. Moreover, the differential equation depends on a general functional term G_x. By means of a fixed point argument, we provide sufficient conditions for the existence of solutions, in a suitable weak sense, satisfying general boundary conditions expressed by means of a functional term H.